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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,802	06/20/2001	Lewis Gruber	9792350-0014	6168

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EXAMINER

SIEW, JEFFREY

ART UNIT

PAPER NUMBER

1637

DATE MAILED: 08/21/2003

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/886,802

Applicant(s)

GRUBER ET AL.

Examiner

Jeffrey Siew

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 27 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-19, 21, 23-54, 57-81 and 83-104 is/are pending in the application.
- 4a) Of the above claim(s) 105-167 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-19, 21, 23-54, 57-81 and 83-104 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 27 November 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other

DETAILED ACTION

Request for Continued Examination

1. The request filed on 6/27/03 for a Request for Continued Examination (RCE) under 37 CFR 114 is acceptable. An action on the RCE follows. Pending claims to be examined are 1-19,21,23-54,57-81,83-104. It is noted that claim 35 was not noted in the RCE paper no. 17. However, it is presumed that claim 35 has not changed from original claim 35.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-19,21,23-54,57-81,83-104 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The response has introduced the term "communal diffusional spatial array" and does not point where in the specification support is found. A review of the specification does appear to provide adequate support for such a term. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-19,21,23-54,57-81,83-104 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A) Claims 24,26,27,40,42,43,44 are dependent on a cancelled claim 20. It is unclear as to the scope of the claim.

B) The term "communal diffusional spatial array" is indefinite. It is unclear as to what limitation(s) would fall within the scope of the term. A review of the specification does not appear to define the term and the phrase does not appear to be well known common term.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-19,21,23-54,57-81,83-89 & 104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ulmer et al in view of Misawa et al (Macromolecules vol. 26 pp. 282-286 1993)

Ulmer teach the apparatus and method of using an movable optical trap to capture bound and unbound multiple probes and trapping the probes and tracking the probe as it interacts with a target (see whole document esp. abstract, col. 1 lines 45-62, col. 5 lines 17-30 & col. 7 lines 27-44). They teach a multi-position scanning laser trap which is used to translate multiple single molecule complexes in parallel as in an array fashion for increased throughput. Particles can be moved independently (see col.12 lines 37-45). They teach that Multibeam photonic Tweezers for use of multiposition traps (see col. 12 line 49) They teach the use of laser tweezers traps (see col.1 2line 49 & col. 1 line 39).. A computer is operably connected to apparatus (see col.12 line 21). They teach the use of video camera (see col.2 line 44). They teach that optical trap may include objective lens and beam (see figure 2A-2H & col. 2 line 50-52). They teach the use of various lasers and fluorescent dyes to detect the spectrum of the label (see col. 10 line 62 –col.11 line 21). They teach the assay of several biological and chemical material such a antigen and antibody, DNA oligonucleotide extensions (see col. 5 lines 17-30 & col.6 line 15-42). They teach the use of subcells or regions in which the particles are moved (see Figure 3A & & col. 4 lines 30-40).

Ulmer et al do not explicitly teach a multiple parallel laser trap.

Misawa et al teach multiposition scanning laser trap to analyze multiple particles in parallel for increased sample throughput (see whole document).

One of ordinary skill in the art would have been motivated to apply Misawa et al's scanning laser traps to Ulmer et al's method of optical scanning in order to scan multiple probes simultaneously. It would have been prima facie obvious to apply Misawa et al's laser scanning traps to Ulmer et al's optical scanning of biological material in order to increase the throughput analysis.

5. Claims 90-104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uhlmer et al (US5,776,674 July 7, 1998) in view of Crier et al (US6,055,106 April 25, 2000).

The teachings of Uhlmer et al are described previously.

Uhlmer et al do not teach beam altering optical element.

Grier et al teach the formation of various beam patterns to create arrays of optical traps (see whole document & col.3 line 60-65). They teach the use of diffractive optical element which can include computer generated holograms which split the input light beam into patterns of different regions (see col. 4 lines 56-65). They teach the beams then enter the back aperture 24 of objective lens 20 (see Figure 3) They also teach the use of dichroic beamsplitter to split beam (see col. 5 line 53-64). They teach dynamically translating of traps (see col.5 lines 22-44).

One of ordinary skill in the art would have been motivated to apply Grier et al's teaching of multiple optical trap to Ulmer et al's method of assaying in order to increase the throughput of samples. Grier et al states the deficiency in manipulating multiple particles with multiple

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beams of light in prior art technology (see col. 1 lines 25-30) . Grier et al state that the use of holograms or dichroic mirrors provide the advantage of creating multiple beams to create multiple traps from within a single laser source. It would have been prima facie obvious to apply Grier et al's multiple beam apparatus to Uhlmer et al's method in order to screen multiple samples simultaneously thus increasing throughput analysis and/or production.

6. The response filed 6/27/03 has been fully considered and deemed not persuasive. The response states the Ulmer do not teach more than two probes in the three dimensional array. Moreover they argue that Ulmer do not teach trapping several particles simultaneously. They state that they disclose a conventional optical trap by citing col.2 lines 19-21 and point to one embodiment of Ulmer et al where a single bead is selected (see col. 5 lines 25-33). However, Ulmer et al does teach multiple particles (see col.5 lines 20-30). They further strongly suggest using Misawa et al's multiposition scanning laser trap to track multiple single molecule complexes in **parallel and independently** for increased sample throughput (see col. 12 lines 37-53). Moreover, the claims read broadly to at least include two probes for inclusion in an array and tracking at least one of the two probes. Ulmer et al suggestions of simultaneous multiple tracking as taught by Misawa et al would provide the motivation to provide for multiple tracking. The response further states that the probes are organized in a communal diffusional spatial array and pattern can be made in a communal diffusional spatial array not just one plane as in Ulmer et al The introduction of the term "communal diffusional spatial array" replaced the term three dimensional array. The response appears to be reading limitations into a phrase which already

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has 112 first and second paragraph issues. A review of the state of the art and the specification leads to the conclusion that Ulmer et al and Misawa et al would still read reasonably on the term.

The response also states that Ulmer et al do not teach known binding and reactivity characteristics. Ulmer et al teach a variety of biological reagents such as DNA molecules, antigen and antibodies which are known to have binding and reactivity characteristics.

Similarly, the response also states that Grier et al do not teach the communal diffusional spatial array and does not make up the deficiencies of Ulmer. As stated above, the Ulmer suggestions in combination with Misawa et al meet the claimed limitations. The response further states that Grier do not teach using spectra to analyze the biological specimen. The limitation is supplied originally by Ulmer et al which teach the use of various wavelengths for fluorescence applications (see col.3 line 25-30 & col. 6 line 1-5).

Moreover, the response states that Grier et al are not drawn to the method of claimed invention but rather for trapping silica spheres in three dimensions. Grier et al state that the application of optical tweezer includes chemical sensor arrays for use in chemical and biological assays (see col1 lines 34-35). The advantages that Grier et al teach i.e. three dimensional optical gradient trapping would be applicable to Ulmer and Misawa et al's combined invention of multiple trapping.

SUMMARY

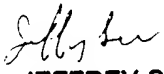
6. No claims allowed.

CONCLUSION

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Siew whose telephone number is (703) 305-3886 and whose e-mail address is Jeffrey.Siew@uspto.gov. However, the office cannot guarantee security through the e-mail system nor should official papers be transmitted through this route. The examiner is on flex-time schedule and can best be reached on weekdays from 6:30 a.m. to 3 p.m. If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Gary Benzion, can be reached on (703)-308-1119.

Any inquiry of a general nature, matching or filed papers or relating to the status of this application or proceeding should be directed to the Tracey Johnson for Art Unit 1637 whose telephone number is (703)-305-2982.

Papers related to this application may be submitted to Group 1600 by facsimile transmission. Papers should be faxed to Group 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CM1 Center numbers for Group 1600 are Voice (703) 308-3290 and FAX (703)-308-4242.


JEFFREY SIEW
PRIMARY EXAMINER

5/24/07